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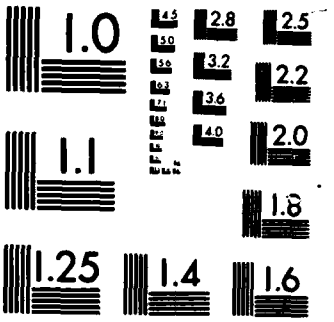

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FOREIGN TECHNOLOGY DIVISION

A MIRROR MAGNIFIER

by

M.N. Sokol'skiy

EDITED TRANSLATION

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A MIRROR MAGNIFIER

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

GRAPHICS DISCLAIMER

All figures, graphics, tables, equations, etc. merged into this translation were extracted from the best quality copy available.

A MIRROR MAGNIFIER

M. N. Sokol'skiy

Mirror magnifiers are known that contain a light with collimator, a system of mirrors and an output registration system.

The described device differs from the known types by the fact that, behind the collimator, there is a diaphragm with two openings, the orthogonal projection of one which, onto the plane perpendicular to the principal cross section of the object, is covered by the trace of the object on this plane, while the projection of the other opening lies outside this trace.

Such differences enable an improved measurement precision of the taper of an object placed in the space between the mirrors.

Figure 1 shows the optical layout of the device; Fig. 2, the view along arrow A.

The wedge 1 being inspected is placed between the two plane parallel mirrors 2,3. The source creating a parallel light beam may be, e.g., a point source 4 with collimator 5 or laser. Behind the mirror 3 is a focusing system 6 and a measurement unit, e.g., consisting of measurement wedges 7 and an eyepiece 8.

The device also contains elements for regulating the angle of incidence of the light on mirror 2, schematically depicted in the form of a pair of rotating wedges 9, elements for regulating the distance between the mirrors 2 and 3, which may be, e.g., micrometer screws. Between the collimator 5 and the mirror 2 there is a diaphragm 10, cutting out two narrow light beams 11,12 from the incident light. Beam 11 experiences refraction in the wedge, and therefore the angle between the beams gradually increases by an amount that depends only on the size of the angle β between mirrors 2,3 and the angle of the inspected wedge α. The distance between beams 11,12 in the focal plane of the system is determined directly by the angle of the inspected wedge.

Thus, measuring the angle of a wedge in such device consists in measuring the distance between beams 11,12 in the focal plane F of the system 6, the angle γ of which distance is:

$$\gamma = [2(n-1)\alpha + 2\beta]N - 2\beta N,$$

where n is the index of refraction of the wedge, N is the number of reflections from mirror 2.

For an optimal number of reflections N, the angle of incidence of the beams Θ on mirror 2 or the distance between the mirrors t is regulated to maintain the relationship:

$$\sin\theta \approx \frac{p}{2tN},$$

where p is the distance between the optical axes of the collimator 5 and the focusing system 6.

Besides the above, other modifications of the device are possible. In particular, the collimator 5 and the focusing system 6 may be combined, i.e. built as an autocollimator; it is

possible to use different versions of regulation and measurement components, and so forth.

Enhanced measurement precision is achieved by the presence of elements to separate the incident light into two parallel beams, mutually displaced in the direction perpendicular to the principal cross section of the inspected wedge so that, during repeated reflection from the mirrors, only one beam passes through the wedge. The angle between both beams at the output is determined solely by the angle of the inspected wedge, and does not depend on the precision of manufacture or adjustment of the mirrors.

Patent Claims

A mirror magnifier, containing a light with collimator, a system of mirrors and an output registration system, distinguished by the fact that, to enhance the measurement precision of wedgelike objects placed in the space between the mirrors, behind the collimator there is a diaphragm with two openings, the orthogonal projection of one which onto the plane perpendicular to the principal cross section of the object is covered by the trace of the object on this plane, while the projection of the other opening lies outside this trace.

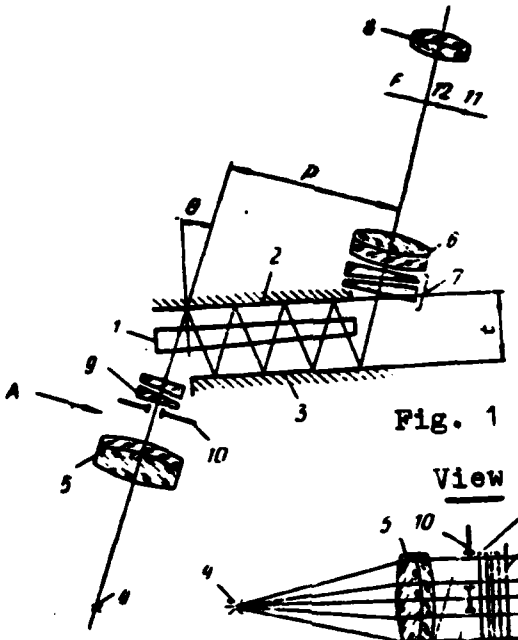

Fig. 1

View A

Fig. 2

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